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NEW AND INTERESTING FOSSILS FROM THE
DEVONIAN OF NEW YORK

BY
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The new crinoids described in this paper are from the Upper Devonian rocks of southern New York, from which only a few species are known. This is due to the rarity of their calyces since whole beds in the Portage and Chemung formations are often entirely made up of crinoid joints and stems. Because of their occurrence in sandstones and sandy-shales, the calcareous portions of the fossils have usually been entirely removed by percolating waters. From these moulds thus formed, beautiful casts may be made by means of gutta percha. By this method the most minute details may be reproduced, but unfortunately these casts become brittle with age. The phyllocarid *Echinocaris punctata* (Hall) Whit., is mentioned because of its occurrence in a new horizon. The writer wishes to express his acknowledgements to Professors H. S. Williams and G. D. Harris for the loan of the crinoids and for various helpful suggestions in the course of the work.

Trichotocrinus, n. sub. gen.

Dorsal cup agreeing in all its characters with *Melocrinus*. Resting upon the upper sloping surface of the second (2nd) costals are two rows of pentagonal shaped distichals which form part of the dorsal cup. From these are continued free rays, which are united throughout their length and give off from each fourth (4th) or fifth (5th) brachial plates, small biserial armlets bearing pinnules. Further up in place of a pair of these armlets, two lateral branched are formed which being oppositely arranged and together with the main trunk produced a trichotomy. The lateral branches in turn give off from each fourth (4th) or fifth (5th) brachial plates, armlets which appear to be uniserial and which in turn give off pinnules. A deep ventral groove is con-

tinued up along the fusion of the rays throughout their length and extending also into the two lateral branches.

Remarks on *Trichotocrinus*

The characters as given above show the intimate relation of the form with *Melocrinus*. The structure of the arms is however very different and as in some other members of the family, is a measure of the amount of evolution through which they have passed. Because only a single specimen is known and that with only one arm preserved, it has been considered advisable to give it only sub-generic rank. The family *Melocrinidae* does not survive the Devonian, being represented in the Sub-Carboniferous by the closely related family *Actinocrinidae*. For this reason such variation from the typical Melocrinid arm is apt to be looked upon as aberrant or regressive in nature. However, a more ready explanation is found in considering it a natural result of evolution, which may be thought of as commencing with *Mariacrinus* and passing through *Melocrinus*, two genera, which differ from each other only in their arm characters. The presence or absence of interdistichal plates appears also to be a measure of evolution, becoming eliminated as the arms become more rigidly biserial.

In *Mariacrinus*, the arms are typically uniserial and bear armlets, with pinnules only on one side. The next step is the fusion of its uniserial arms in the production of biserial ones, which commences proximally, finally extending throughout the entire length of the arms. Species occur in which this fusion has been but partially completed.* The complete fusion of the arm give rise to the genus *Melocrinus* (see Plate 6, figs. 4, 5, 6.) with armlets arranged on opposite sides and which are usually biserial.† The last step in this evolution would necessarily be

**Mariacrinus beecheri* Talbot. Revision of the New York Helderbergian Crinoids. Am. Jour. Sci. 4th series, vol. 20, p. 25, 26. proximal portion biserial only, uniserial portion longest, hence referred to *Mariacrinus*.

†*Melocrinus pachydactylus* Con. Talbot, see above p. 27, states that this species has uniserial arms and not biserial ones as previously described and figured.

in the development of its armlets and which becoming concentrated in a pair of them resulted in the *Trichotocrinus* type of arm. This development has been attended by the formation of secondary armlets along these two lateral branches and which bear pinnules. We see then in this genus, a case where some of the pinnules have developed into pinnule bearing armlets. These armlets appear to be biserial although this point is not clear, because of their poor preservation. This evolution as traced above is also brought out when these forms are considered in their relation to geologic time.

<i>Trichotocrinus</i> .	Upper Devonian (Portage form).
<i>Melocrinus</i> .	Silurian and Devonian.
<i>Mariacrinus</i> .	Silurian and Lower Devonian.

Melocrinus (*Trichotocrinus*) harrisi, n. sp.

Plate 6, Figs. 1, 2.

Specimen about medium size. Dorsal cup as high as wide, spreading rapidly. Arms five biserial and developing three biserial branches, which give off armlets bearing pinnules.

Plates slightly tumid and beautifully ornamented with well defined ridges, those of the second series of plates passing from one plate to another. From the radials a strong and well defined ridge is carried up along the brachials, interruptedly at each plate, and dividing the dorsal area into five nearly equal fields. Because of the hexagonal shape of the plates, the ridges tend to be in the form of six (6) armed stars, all the arms of which seldom join in the center and never do on the radials, but are well marked on the borders of the plates. Between these ridges are situated small bead-like elevations. Suture line deeply grooved.

Basals four (4) forming a low cup and projecting beyond the surface of the radials. Radials about as wide as high and heptagonal in shape, except the anterior one, which is hexagonal and rest squarely upon the basal plate. Costals about as wide as high, decreasing in size upwards and hexagonal in shape, except the second costal which is heptagonal and supports on its inner face the next order of brachial, the distichals. Distichals 2x10, those of the same ray in contact laterally. First two rows of distichals, pentagonal in shape, elevated in the center and with two small bead-like elevation on the adjacent and opposite extremities, the

others much smaller and plain. The trunk tapers upwards and is deeply grooved along the fusion of the rays and which also extend into the branches. Armlets given off at every 3d, 4th or 5th brachial plate, those of the branches at each 4th brachial plate:

Regular interradians 1, 2, 3, and others above, more or less hexagonal in shape and highly ornamented. The plates rapidly decrease in size on passing upwards towards the ventral surface and the shape varies.

Observations:

The specimen was found at the McGraw or University quarry, which is situated in the center of the Ithaca formation of the Portage series. It has been highly productive of rare and interesting forms.

Melocrinus williamsi, n. sp.

Plate 6, Fig 3.

Specimen about medium size. Dorsal cup higher than wide. Arms five, biserial.

Plates tumid, with the centers of each, supporting a conspicuous spiniferous node. This applies not only to the plates of the dorsal cup, but also to the plates of the ventral surface and of the anal tube. The centers of the radials and brachials are connected by a ridge like elevation, which commencing on the basal plates follows up through the radials and brachials, dividing the dorsal cup into five equal fields. The interradians above the first (1st) have their centers connected by a low ridge, which passes from one plate to another, but is much less pronounced. The spiniferous node in the center of the radials and of the first (1st) interradiial plates is surrounded by a circle of low bead-like elevations.

Basals four (4) strongly tumid, those shown on the specimen pentagonal in shape. Radials twice as large, those shown on the specimen pentagonal in shape and as wide as high. Costals two (2), of nearly equal size, but much smaller than the radials. First (1st) costal hexagonal, second (2nd) heptagonal in shape and both slightly higher than wide. Distichals 1x10 borne on the inner surface of the second (2nd) costals, pentagonal in shape and slightly higher than wide.

Interradials 1, 2, 3, 3. First (1st) interradial hexagonal, slightly higher than wide, second (2nd) interradial irregularly hexagonal, as are the remainder of the interradials. Plates of the ventral surface small, apparently of an irregular hexagonal shape.

Anal tubes long and composed of several small irregular plates.

Remarks :

This species is remarkable in its possession of the strongly spiniferous character of its plates. In this respect the species approaches *Melocrinus gregeri** Rowley from the Hamilton of Missouri, which however has the spiniferous nodes, confined only to the larger plates of the dorsal cup, as well as lacking the ridge-like elevations extending through the radials and brachials and the circle of bead-like elevations around the spiniferous centers of the radials and first (1st) interradials.

Observation :

This specimen is from the Portage rocks near Cortland, N. Y.

Melocrinus reticularis, n. sp.

Plate 7, Fig. 1.

Shape pyriform spreading rapidly from the narrow base. Basals strongly tumid only two shown on the specimen, anterior one hexagonal, the other pentagonal in shape. Radials (three shown) anterior one resting upon the hexagonal base, hexagonal in shape, the other two heptagonal, about as wide as high. First (1st) costal slightly longer than wide and hexagonal in shape. The second (2nd) costal axillary and heptagonal in shape, supporting upon its two upper sloping sides the distichals. Distichals 2x10 and incorporated in the dorsal cup. Their shape is not easily discernible because their sutures are indistinct.

Arms biserial (one arm is shown lying on its side embedded in the rock) ; armlets appear to be given off from each third (3d) brachial plate.

*American. Geologist., 1893, vol. 12, p. 303-304, fig. 1. In this paper Rowley describes several species of Crinoids from the Devonian and Sub Carboniferous rocks of Missouri ; amongst these *Melocrinus gregeri* which appears to have been later described by Wachsmuth and Springer under the name of *Melocrinus Calvini* W+S. (Mem. Mus. Comp. Zool., vol. 21, p. 300, pl. 22, fig. 6. 1897.)

Commencing on the basals, a groove is continued up through the radials and costals, branches into the distichals on the second (2nd) costal. Plates with the exception of the basals flat, the radials and brachials only slightly convexed by the longitudinal groove. Plates ornamented with raised lines, radiating in pairs or by threes from, but not showing in the centers of the plates. These lines pass across the sutures of the plates. Sutures distinct only between the lower plates of the dorsal cup, becoming very indistinct on passing upwards. Beyond the third series of interradials the sutures are not visible, the lines of ornamentation on the plates becomes single, producing a net-like appearance.

First (1st) interradials hexagonal in shape, longer than wide, and supported on the upper sides of the radials and first (1st) costals. These are followed by the second (2nd) series of interradials consisting of two plates which are irregularly hexagonal in shape and wider than high. The third (3d) series of interradials consist of three (3) plates. Above this series the suture lines becomes indistinct.

Radials, first (1st) costals, first (1st) and second (2nd) interradials have ornamentation lines of three (3) each, the two lateral ones shorter than the middle line and passes nearly to the middle of the plates. Other plates have only one ornamental line passing across the sutures of the plates.

Observations :

This specimen is from the McGraw quarry zone from which *Trichotocrinus harrissi* n. sp. was obtained.

Summary of known species of Melocrinidae from the Portage formation.

Melocrinus clarkii (Hall) Williams.

“ *bainbridgensis* (Hall) Whitfield.

“ *williamsi* n. sp.

“ *reticularis* n. sp.

“ (*Trichotocrinus*) *harrisi* n. sp.

In the Chemung rocks at Chemung Narrows and various other localities is found a large species of Melocrinid crinoid whose stem is often several feet in length. The head of this crinoid has

never been described, but the characters of the stem seems to place it in this family.

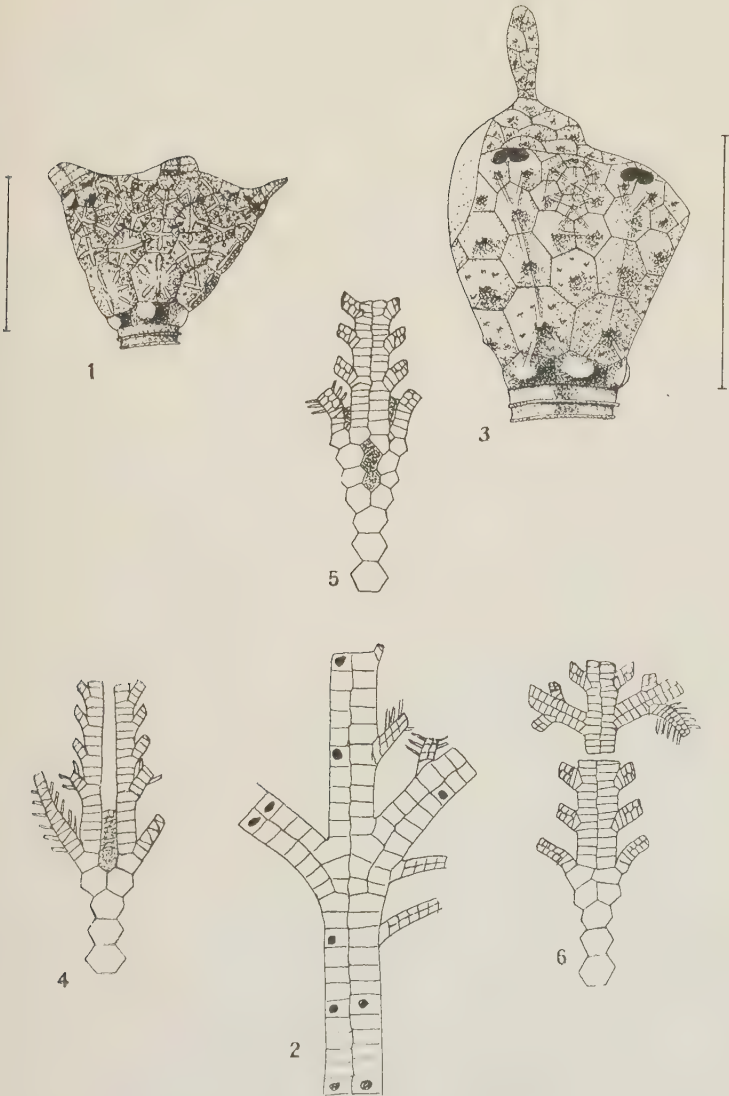
Echlnocaris punctata (Hall) Whitfield

Plate 7, Figs. 2, 3, 4.

This species, of which two individuals were found associated with *Spirifer mesastrialis* and *Cryptonella eudora*, was collected in the Ithaca shale beds of the Portage formation, as they are exposed in the McGraw or University quarry, which is situated at the lower end of the Cornell Campus. Comparison with forms from the Hamilton show no characters to distinguish the two from each other. It is interesting to note its appearance in higher beds, associated with recurrent Hamilton species, and as having changed but little in the time interval.

PLATE 6

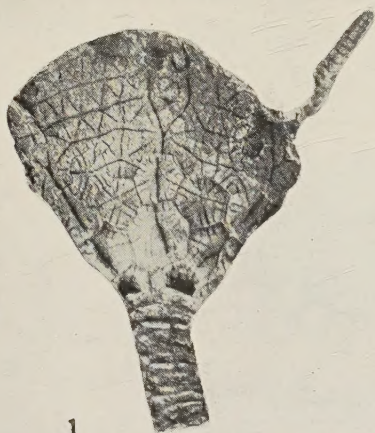
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Dorsal view, showing a portion of the anal tube.	
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5. <i>Melocrinus</i> showing biserial arms. Fig's 4 and 5 are from Wachsmuth and Springer.	
6. <i>Trichotocrinus</i> showing branches of its biserial arms.	2



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PLATE 7

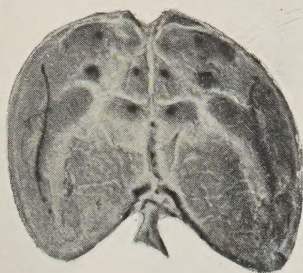
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3. <i>Echinocaris punctata</i> (Hall) Whitf. Exterior impression..	7
4. Cast of specimen shown by Fig. 3.	



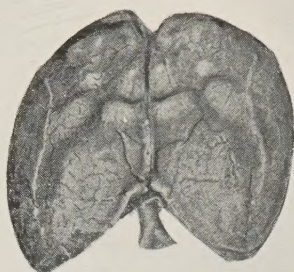
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